

# Efficacy of Tranexamic Acid for Reduction of Postoperative Seroma Formation after Ventral Hernioplasty

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## ABSTRACT

**Objective:** To assess the effectiveness of tranexamic acid for reduction of postoperative seroma formation in patients undergoing ventral hernioplasty.

**Study Design:** Cross sectional study.

**Place and Duration of Study:** This study was conducted at the department of surgery District Headquarter Teaching Hospital Sargodha for duration of one year from September 2019 to August 2020.

**Materials and Methods:** One hundred patients of both genders with ages 20 to 65 years undergoing ventral hernioplasty were enrolled. After written consent, patients were registered for the comprehensive demographic age, sex and body mass index. Patients were categorized in to two equal groups. Group I contains 50 patients and received tranexamic acid 1gm postoperatively while group II didn't received tranexamic acid. Drain output at 1<sup>st</sup> and 5<sup>th</sup> postoperative day was measured. Duration of drain was recorded and compare between both groups. Data was analyzed by SPSS 27.0.

**Results:** There were 14(28%) males and 36 (72%) females in group I while in group II 32 (64%) patients were females and 18 (36%) males. Mean body mass index of patients in Group I was  $24.36 \pm 2.78$  kg/m<sup>2</sup> while in Group II mean BMI was  $24.72 \pm 3.05$  kg/m<sup>2</sup>. A significant short time of drainage was found in Group I  $4.96 \pm 0.85$  days as compared to Group II  $6.88 \pm 1.56$  days (p-value <0.05). In Group I and II 5 (10%) and 8 (16%) patients developed seroma, no significant difference was observed with p-value >0.05.

**Conclusion:** The use of tranexamic acid for prevention of postoperative seroma formation in patients undergoing ventral hernioplasty was effective with less interval of time for removal of drain.

**Key Words:** Drain output, Tranexamic acid, Ventral hernia, Seroma

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## INTRODUCTION

Ventral hernias are one of the most serious issues for general practitioners worldwide. There are many procedures for fixing the ventral hernia, currently the most common being open or laparoscopic hernioplasty<sup>1</sup>. Various forms of mesh have been used for hernioplastia, the most common of which is Prolene mesh, which minimises the chances of recurrence<sup>2</sup>.

A seroma is the fluid aggregation in a tissue that may arise after paraumbilic hernioplasty, where fluid is called serum leaks from surrounding lymph and weakened blood vessels.

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Cells commonly occur in the solution, which is usually transparent. The development of seroma can be associated with an increased risk of infection and surgical collapse. After certain procedures, surgical drain tubes and bulb suction systems are used to reduce the chance of seroma formation. This allow the amount of fluid leakage to be tracked and the drainage is removed until reduced. Seromas can grow soon after surgery if drains are not used and after drainage is removed<sup>3</sup>. The most frequent postoperative complication of ventral wall hernia repair is the development of seroma. There are various causes which are inevitable and lead to seroma development, such as unnecessary cautery, dissection in the air under the Scarpa's fascia, sclerosing, etc.<sup>4</sup> This seroma, whether it becomes infected and is not cleared, causes problems such as wound inflammation and wound dehiscence<sup>5</sup>.

Tranexamic acid is a synthetic derivative of the amino acid lysine, providing anti-fibrinolytic activities that inhibit and resolve uncontrolled bleeding in the main and secondary stages of wound cure<sup>6-7</sup>. When fibrinolysis exceeds coagulation, surgical bleeding can occur unless the bleeding control methods are properly employed. Tranexamic acid is administered to prevent

the fibrinolysis process. It inhibits the release of plasminogen in plasmin. Its use will minimise postoperative bleeding by 34%.<sup>8</sup>

The administration of tranexamic acid may be given orally or intravenously, and the intravenous administration of tranexamic acid has shown a 34% reduction in postoperative bleeding. Intravenous dosage of tranexamic acid (10mg/kg body weight) was normally administered in paraumbilic hernioplasty with anaesthesia induction<sup>9</sup>.

**MATERIALS AND METHODS**

This cross-sectional/observational study was conducted at department of surgery, District Headquarter Teaching Hospital Sargodha for duration of one year from September 2019 to August 2020. Total 100 patients of both genders with ages 20 to 65 years undergoing ventral hernioplasty were enrolled. After written consent, patients were registered for the comprehensive demographic age, sex and body mass index. Patients with uncontrolled diabetes mellitus, patients with complicated hernia, patients with recurrence and those with no consent were excluded.

All patients received prolene mesh after sublay repair. Patients were categorized in to two equal groups. Group I contains 50 patients and received tranexamic acid 1gm postoperatively at skin closure and then 500mg 12 hourly till 5<sup>th</sup> postoperative day while group II didn't received tranexamic acid. Drain output at 1<sup>st</sup> and 5<sup>th</sup> postoperative day was measured. Duration of drain was recorded and compare between both groups. After hernioplasty the vacuum drain in both groups was positioned and sustained until the production was less than 30 ml/day. Drain output at 1<sup>st</sup> and 5<sup>th</sup> postoperative day was measured. Duration of drain was recorded and compare between both groups.

All the data was analyzed by SPSS 24.0. Chi-square test was used to compare the drain output and seroma formation between both groups. P-value <0.05 was taken as significant.

**RESULTS**

**Table No.1: Demographical details of all the patients**

Variables	Group I	Group II
Men Age (yrs)	36.82±7.54	37.03±6.85
<b>Gender</b>		
Male	14(28%)	18 (36%)
Female	36 (72%)	32 (64%)
<b>BMI</b>	24.36±2.78	24.72 ± 2.05

Mean age of patients in group I and II was 36.82±7.54 years and 37.03±6.85 years. There were 14(28%) males and 36 (72%) females in group I while in group II 32 (64%) patients were females and 18 (36%) males. Mean

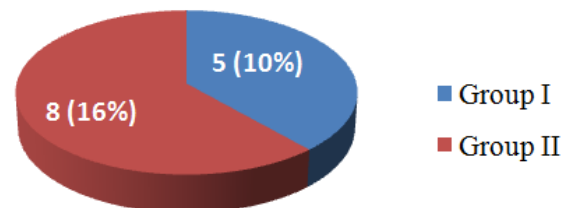
body mass index of patients in Group I was 24.36±2.78 kg/m<sup>2</sup> while in Group II mean BMI was 24.72 ± 2.05 kg/m<sup>2</sup>. (Table 1)

Significantly shorter time of drainage was found in Group I 4.96±0.85 days as compared to Group II 6.88±1.56 days (p-value <0.05). At 1<sup>st</sup> postoperative day mean drain output in Group I was 113.52±30.44 ml and in Group II it was 134.15±48.66 ml. At 5<sup>th</sup> postoperative day drain output in Group I was 60.48±27.46 ml and in Group II it was 90.71±30.38 ml, a significant difference was found between both groups with p-value <0.05. (Table 2)

**Table No.2: Drain output and drain duration between both groups**

Characteristics	Group I	Group II	P value
Mean Drain Duration (Days)	4.96±0.85	6.88±1.56	0.001
Drain output at 1 <sup>st</sup> PO day	113.52±30.44	134.15±48.66	<0.001
Drain output at 5 <sup>th</sup> PO day	60.48±27.46	90.71±30.38	<0.001

In Group I and II 5 (10%) and 8 (16%) patients developed seroma, no significant difference was observed with p-value >0.05.



**Figure No. 1: Frequency of Seroma formation between both groups.**

**DISCUSSION**

Abdominal wall hernias are one of the most frequent surgical issues, primarily when they are caused by a disease that raises cavity pressure in the abdomen.<sup>10</sup> Atransverse incision and suction drain for the hernioplastic and on-lay mesh repair is presented in both patients in both groups. We find that gender and age have not been substantially related to complications in both classes, such as seroma, injury infections and post-operative drainage, consistent with Patel et al<sup>10</sup>. Seromas are normal and normally arise after multiple forms of hernia repairs, in particular with large tissue disorders. Although liquid fat, serum, inflammatory exudates and lymph fluid are known to collect under the skins, the precise aetiology of the seroma formation remains controversial. The amount and length of seroma growth vary and other factors, including dissection, skin raising and energy or the knife, affect it. Untreated seromas are typically infected.<sup>11-13</sup> The

proposed dose of tranexamic acid is 1g (1 ampoule 10 ml or 2 ampoule 5 ml) every 6 to 8 hours, with a sluggish injection intravenous equivalent to 15 mg/kg.<sup>14</sup> The incidence of the postoperative seroma development declined as well (27% compared to 37%, P = 0.2).<sup>15</sup>

We found significantly shorter time of drainage in Group I 4.96±0.85 days as compared to Group II 6.88±1.56 days (p-value <0.05). A study conducted by Ahmad H et al<sup>16</sup> reported that tranexamic acid had shorter duration of drainage. Postoperatively 65 (81%) patients developed seroma which resolved within five days.

We found that At 1<sup>st</sup> postoperative day mean drain output in Group I was 113.52±30.44 ml and in Group II it was 134.15±48.66 ml. At 5<sup>th</sup> postoperative day drain output in Group I was 60.48±27.46 ml and in Group II it was 90.71±30.38 ml, a significant difference was found between both groups with p-value <0.05. These results were comparable to many of previous studies in which tranexamic acid showed significant decrease in drain volume and effective for the prevention of seroma formation. Albatanony A et al reported that at first day drain output was 106.5±39.7ml and at fifth postoperative day it was 67.6 ml in patients received tranexamic acid while patients who didn't received tranexamic acid drain output at first postoperative day was 157.5±60.8ml and at 5<sup>th</sup> day it was 93.1ml<sup>17</sup>.

In the current analysis, 5 (10 percent) had seroma that had tranexamic acid, while 8 (16 percent) of patients who had no tranexamic acid had seroma. A research performed<sup>18</sup> concerning the role of tranexamic acid in seroma development prevention recorded that 14.9 percent had seroma patients who had tranexamic acid while 65.7 percent had seroma patients who had not obtained tranexamic acid.

Study by Ahmed H et al<sup>16</sup> showed that 81% of seroma patients in the group had received tranexamic acid subsidies within 5 days and took longer than 5 days, compared to 19% in patients. The active reduction in postoperative drinking, seroma and severe fluid development in anti-fibrinolytic medication tranexamic acid was observed. According to studies it increases wound healing. Tranexamic acid has also been involved in reducing our sample seroma levels. The average postoperative drainage volume as well as the median hospital time for 1 g tranexamic acid per day were both significantly decreased by a double-blind randomised trial<sup>19</sup>.

## CONCLUSION

Tranexamic acid decreases the development of post-operative seroma in ventral hernia repair patients following mesh hernioplasty. It also decreases the overall drain removal time after the service. Thus, it has been concluded that Tranexamic acid in separated doses decreases the patient's cumulative cost and morbidity and allows them to get back to normal early.

### Author's Contribution:

Concept & Design of Study: Allah Nawaz  
 Drafting: Ahmad Hassan Khan, Khalid Mahmood  
 Data Analysis: Raza Farrukh, Muhammad Arshad  
 Revisiting Critically: Allah Nawaz, Ahmad Hassan Khan  
 Final Approval of version: Allah Nawaz

**Conflict of Interest:** The study has no conflict of interest to declare by any author.

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